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10/724,897	12/02/2003	Yuan-Chi Chang	YOR920030555US1	2439

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EXAMINER
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PHAM, HUNG Q

ART UNIT	PAPER NUMBER
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2168

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/724,897	<b>Applicant(s)</b> CHANG ET AL.	
	<b>Examiner</b> HUNG Q. PHAM	<b>Art Unit</b> 2168	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 January 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-6,8-19,21-31 and 33-38 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6,8-19,21-31 and 33-38 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Response to Arguments*

Applicant's arguments with respect to the steps of *summarizing attributes of semantic object* and *indexing the summary of attributes* have been fully considered but they are not persuasive.

- As argued by applicant on page 11:

Bergman considers that extraction of semantic objects would be straightforward to implement, but this feature was not implemented for purpose of that article.

Therefore, Applicants again submit that, if this feature to extract semantic objects is not even implemented, then there are no semantic objects in Bergman that would be subject to be summarized.

The examiner respectfully disagrees.

As recited in the claim, *attributes of semantic object* is *summarized*. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., *no semantic object in Bergman that would be subject to be summarized*) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

As disclosed by Bergman, data are collected from an oil well (Bergman, Page 450 Lines 5-6). Well data are used for identifying semantic object, e.g., sandstone or shale strata (Bergman, Page 450 Lines 15-20). In PetroSPIRE, the set of object definitions is created by a domain expert (Bergman, Page 457 Lines 27-28). As shown in FIG. 4(a), a shale strata is defined by summarizing attributes of shale strata such as FMI Texture and Gamma Ray. Texture and the value are indexed (Bergman, Page 457 Lines 43-44 and 50-51). The data repository for SPIRE includes a relational database for storing derived features and semantic object (Bergman, Page 453 Lines 14-15).

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The teaching of Bergman as discussed indicates the steps of:

*summarizing attributes of said semantic object*, e.g., as in FIG. 4(a) attributes such as FMI

Texture and Gamma Ray of semantic object shale strata is summarized;

*indexing the summary of attributes*, e.g., texture and value are indexed as taught by Bergman at Page 457 Lines 43-44 and 50-51.

- As further argued by applicant on page 11:

In the rejection, the Examiner points to various descriptions, including Figure 4(a). However, Figure 4(a) shows a section of raw data that has been identified after providing an improved definition of shale.

This improvement in the process of identifying features is not equivalent to extracting semantic objects from the raw data, since the semantic objects involve a higher level of abstraction above features, and Bergman clearly states that the capability of locating the higher-level semantic objects has not even been implemented, even though it would have been straightforward to do so.

The examiner respectfully disagrees.

As recited in the claim, *attributes of semantic object* is *summarized*. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., *this improvement in the process of identifying feature is not equivalent to extracting semantic objects from the raw data, since the semantic objects involve a higher level of abstraction above features*) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

- Applicant's arguments on page 12 are similar to the arguments on page 11. The examiner respectfully points out that the features upon which the applicant relies, e.g., *semantic*

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*object extraction*, are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

- Applicant's arguments with respect to the combination of Bergman and Li reference on page 13 have been fully considered but they are not persuasive at least in view of the Bergman teaching of the steps *summarizing attributes of said semantic object* and *indexing the summary of attributes* as discussed above.

- Applicant's arguments with respect to the combination of Bergman/Li in view of Yu reference on page 13 have been fully considered but they are not persuasive at least in view of the Bergman teaching of the steps *summarizing attributes of said semantic object* and *indexing the summary of attributes* as discussed above.

In light of the foregoing arguments, the 35 U.S.C. § 102/103 is continued as following.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claims 1-6, 8, 9, 12-19, 21, 22, 25-31, 33, 34, 37 and 38 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious**

over Bergman et al. [**PetroSPIRE: A multi-modal content-based retrieval system for petroleum applications**] and Li et al. [**Comparing Texture Feature Sets for Retrieving Core Images in Petroleum Application**].

Regarding claims 1, 13, 14 and 26, Bergman teaches *a method for storing a semantic object* (Bergman, Abstract), the method comprising:

*summarizing attributes of said semantic object* (As in FIG. 4(a) attributes such as FMI Texture and Gamma Ray of semantic object shale strata is summarized);

*indexing the summary of attributes* (Texture and the value are indexed (Bergman, Page 457 Lines 43-44 and 50-51)); and

*storing the summary of attributes and the index of the summary of attributes* (The data repository for SPIRE includes a relational database for storing derived features and semantic object (Bergman, Page 453 Lines 14-15)), *wherein said summary of attributes comprises one of a slice label, a signal strength, and a coordinate of a surveyed segment* (As in FIG. 4(a) the Gamma Ray as *a signal strength*).

The missing of Bergman is *geological seismic survey data* for deriving semantic object.

However, as taught by Bergman at Page 457 Lines 32-42, SPIRE implements the Li's algorithm for selecting texture features. As taught by Li at Page 2, in petroleum exploration, other than core images, seismic data or *geological seismic survey data* is used for extracting texture features.

By incorporating Li's technique in SPIRE, *geological seismic survey data*, e.g., seismic data, is an inherited feature for generating texture features.

Regarding claim 1, 13, 14 and 26, Bergman teaches *a method for storing a semantic object* (see Abstract), the method comprising:

*summarizing attributes of said semantic object* (As in FIG. 4(a) attributes such as FMI Texture and Gamma Ray of semantic object shale strata is summarized);

*indexing the summary of attributes* (Texture and the value are indexed (Bergman, Page 457 Lines 43-44 and 50-51)); and

*storing the summary of attributes and the index of the summary of attributes* (The data repository for SPIRE includes a relational database for storing derived features and semantic object (Bergman, Page 453 Lines 14-15)), *wherein said summary of attributes comprises one of a slice label, a signal strength, and a coordinate of a surveyed segment* (As in FIG. 4(a) the Gamma Ray as *a signal strength*).

The missing of Bergman is *geological seismic survey data* for deriving semantic object.

However, as taught by Bergman at Page 457 Lines 32-42, SPIRE implements the Li's algorithm for selecting texture features. As taught by Li at Page 2, in petroleum exploration, other than core images, seismic data or *geological seismic survey data* is used for extracting texture features.

By incorporating Li's technique in SPIRE, obviously *geological seismic survey data*, e.g., seismic data, is used to generate texture features.

Regarding claims 2, 15, and 27, Bergman teaches all of the claimed subject matter as discussed above with respect to claims 1, 14 and 26, Bergman further discloses *the semantic object comprises a summary representation of raw data measurements* (Bergman, Page 454 Lines 11-12, indicating that features are extracted from raw data).

Regarding claims 3, 16, and 28, Bergman teaches all of the claimed subject matter as discussed above with respect to claims 1, 14 and 26, Bergman further discloses the step of *searching a database of a plurality of indexed attributes of semantic objects* (Bergman, Page 459 Lines 33 and 41, querying a database which includes an index of texture features).

Regarding claims 4, 17, and 29, Bergman teaches all of the claimed subject matter as discussed above with respect to claims 3, 16 and 26, Bergman further discloses the step of *searching the index of the plurality of semantic object attributes to identify a semantic object having attributes that match a query and retrieving the identified semantic object* (Bergman, Page 452 Lines 18-20, using a semantic definition to search the archive, and subsequently returning the results).

Regarding claims 5, 18, and 30, Bergman teaches all of the claimed subject matter as discussed above with respect to claims 3, 16 and 28, Bergman further discloses *an optimizing mechanism is used in searching to optimize the process of searching* (Bergman, Page 459 Lines 7-10, indicating a dimensionality reduction algorithm that locally reduces the dimensionality of the search space. Lines 5-6 indicate that the search process can be extremely time-consuming if a linear scan is performed, hence, the dimensionality reduction algorithm is presented as a time-saving optimization to the search process).

Regarding claims 6, 19, and 31, Bergman teaches all of the claimed subject matter as discussed above with respect to claims 1, 14 and 26, Bergman further discloses *the semantic object represents a model of a phenomena of interest that is measured by a collection of data which exceeds a data size that is accessible with a predetermined efficiency by multiple simultaneous users* (Bergman, Page 449 Lines 27 and 35, indicating that the semantic objects represent phenomena related to petroleum well-bore data, and that the volume of this data is extremely large).



Regarding claim claims 8, 21, and 33, Bergman teaches all of the claimed subject matter as discussed above with respect to claims 1, 14 and 26, Bergman further discloses *the index of the summary of attributes comprises a plurality of key features that have been resolved into a set of data points and summary statistics* (Bergman, Page 457 Lines 50-51, where summary statistics is read on feature values, because both consist of values summarized from a semantic object).

Regarding claim claims 9, 22, and 34, Bergman teaches all of the claimed subject matter as discussed above with respect to claims 1, 14 and 26, Bergman further discloses *the summary of attributes comprises one of a confidence level, summary statistics and a compact approximation* (Bergman, Page 457 Lines 46-47, where summary statistics is read on vector of feature values, because both consist of values summarized from a semantic object).

Regarding claims 12, 25, and 37, Bergman teaches all of the claimed subject matter as discussed above with respect to claims 9, 22 and 34, Bergman further discloses *the confidence level represents a degree of accuracy of classification for the semantic object* (Bergman, Page 458 Lines 12-14, indicating a similarity of zero or one between objects, zero indicating that the objects do not belong to the same class, one indicating that the objects do belong to the same class).

Regarding claim 38, Bergman teaches all of the claimed subject matter as discussed above with respect to claim 1, Bergman further discloses *the semantic object has been previously extracted* (As disclosed by Bergman at Page 457 Lines 27-29, the object definition can be used to pre-extract semantic object) and *comprises a channel* (Page 450, The Application Area).

The missing of Bergman is *geological seismic survey data* for extracting semantic object.

However, as taught by Bergman at Page 457 Lines 32-42, SPIRE implements the Li's algorithm for selecting texture features. As taught by Li at Page 2, in petroleum exploration, other than core images, seismic data or *geological seismic survey data* is used for extracting texture features.

By incorporating Li's technique in SPIRE, obviously *geological seismic survey data*, e.g., seismic data, can be used to generate texture features and used the texture features for extracting semantic object.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**Claims 10, 11, 23, 24, 35 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bergman et al. [PetroSPIRE: A multi-modal content-based retrieval system for petroleum applications] and Li et al. [Comparing Texture Feature Sets for**

**Retrieving Core Images in Petroleum Application] in view of Yu et al. [A Framework for Mining Sequence Database at Multiple Abstraction Levels].**

Regarding claims 10, 23, and 35, Bergman does not explicitly teach *the compact approximation comprises a multiple segment polyline*.

Yu teaches *the compact approximation comprises a multiple segment polyline* (Yu, Page 268 Col. 1 Lines 1-8, segmenting data, then finding a linear approximation to each segment. These line segments comprise a polyline, since a polyline is simply a line comprised of one or more line segments (see Wikipedia definition of polyline included in this Office Action)).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have modified the method of summarizing a semantic object taught by Bergman by the method of approximating data by a polyline taught by Yu, because approximating a semantic object by a polyline enables similarity searches, particularly to identify data with similar geological features (Yu, Page 267, Col. 1 Lines 6-11 and Col. 2 Lines 4-6).

Regarding claims 11, 24, and 36, Yu further discloses *each segment of the multiple segment polyline comprises a best fit line having end point coordinates and a slope* (Yu, Page 270 Col. 1 Lines 22-25, showing the segments have endpoints; Page 270 Col. 1 Lines 41-43, showing the segments have a slope).

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HUNG Q. PHAM whose telephone number is 571-272-4040. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, TIM T. VO can be reached on 571-272-3642. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you

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would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/HUNG Q PHAM/  
Primary Examiner  
Art Unit 2168

March 4, 2008